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Horse meat scandal – A wake-up call for regulatory authorities

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Abstract

Global incidences of food mis-description and adulteration are increasing and international food trade is disrupted by frequent disputes over food safety and quality requirements**.** This report attempts to present authenticity concerns and discusses the role of regulatory authorities to circumvent the issues relating to meat authenticity. Science based technological solutions to combat fraud or accidental mislabeling are discussed. Allowances for adventitious presence and religious concerns are addressed. In conclusion collective action by continuous monitoring scheme along with improved detection methodologies and stringent regulation on defaulters will certainly minimize or even eliminate authentication problems in future.

Background

Global incidences of food mis-description and adulteration are increasing and international food trade is disrupted by frequent disputes over food safety and quality requirements. The recent controversies surrounding horse meat scandal forces authorities to enforce stringent regulations on food adulterations.

The term adulteration refers “to make impure by adding extraneous, improper, or inferior ingredients”. In the case of meat, it is considered as economic adulteration in which partial or full substitution of species of high commercial value with low value species occurs for commercial gains. These incidences are not only a concern with importation and the meat packer but also at the restaurant and retail level where the substitution is easier to conceal. Although such adulterations do not necessarily pose safety concerns, they constitute consumer fraud and infringe religious faiths. For instance, religious practices in Muslim and Jews populations choose to avoid pork and pork derivatives in their food while Hindu populations avoid beef and beef products (Bonne and Verbeke, 2008).

Moreover, the information provided by the producer should reflect the actual content mentioned in the label so that the consumer can choose the food item that interests them. Thus food authentication has become a routine monitoring parameter for verification of food labeling and legislation issues.

This report attempts to present authenticity concerns and discusses the role of regulatory authorities to circumvent the issues relating to meat authenticity.

Regulatory authorities and analytical capabilities

Food control authorities are constantly upgrading their systems to identify food source and monitor the quality to ensure that proper processing has taken place and labeling information reflects the actual contents. Regular monitoring to counteract fraud has become inevitable for the authorities to assure safe, unadulterated and quality food. Labeling is the primary means of communication between producers and consumers. Although labeling policies differ widely in nature, material facts and allergen information are expected to be part of standard labeling practice (Premanandh, 2011). However, legitimate information on authenticity is generally lacking. For instance, authentication of chicken meat usually involves testing procedures to confirm chicken but not

necessarily other species unless it is suspected for other contaminants escaping testing procedures. FSA data shows that food fraud incidents are on the increase in the current economic climate (Food Standards Agency, 2011).

Numerous analytical techniques have been applied in the recent years to test the authenticity of various food substances. Most notably, protein based assays including immunological techniques and nucleic acid based assay using electrophoretic techniques are applied globally to authenticate food commodities (Cifuentes, 2012). The analytical techniques whether protein based or nucleic acid based, complement or overpower each other in certain cases. Nevertheless, both techniques are currently being used for authenticity related issues with some limitations. Researchers are targeting new techniques and assays to combat the limitations of available methods. However, it must be stated that, despite this ongoing research, those involved in carrying out food fraud are also continuing to develop new ways of circumventing accepted techniques for food authentication.

A typical example of this case is the removal of DNA and protein by digestion techniques before injection of pork into chicken products, thus rendering protein and DNA analysis obsolete in the authentication of products adulterated in this way (Reid *et al*., 2006).

Conversely, adventitious or low level presence of meat traces has become a major concern for regulators to formulate meaningful legislation. The term “adventitious presence” or “low level presence” refers to the unintentional and incidental commingling of trace amounts of one type of meat or meat products with another during processing and handling.

Since most of the processing industries handle more than one meat species, complete removal of trace levels of DNA may not be practical and hence adventitious presence can only be minimized, as a practical matter it cannot be eliminated entirely and is not unique to meat production. Single species abattoirs and processing plants are a potential solution but at added cost. It is therefore essential that these issues are taken very seriously so that consumer rights are protected.

Perspectives

Accidental mislabeling or fraudulent practices need to be controlled by legal authorities by frequent monitoring procedures at all levels starting from slaughterhouses, processors up to the ends of supply chain. Science based technological advancements in detection methods to combat fraud or accidental mislabeling need to be considered and adapted by authorities. For instance, recent advances in 'omic' technologies such as identification of peptide biomarkers specific to a particular meat species, tissue or ingredient by proteomic technologies constitutes an interesting and promising alternative to existing methodologies due to its high discriminating power, robustness and sensitivity (Sentandreu & Sentandreu, E, 2011).

The possibility to develop standardized protein extraction protocols, together with the considerably higher resistance of peptide sequences to food processing as compared to DNA sequences, would overcome some of the limitations currently existing for quantitative determinations of highly processed food samples. Research focus on relatively novel techniques such as SNIF-NMR, IRMS and electronic nose should be encouraged as they offer greater potential in food authentication (Reid *et al*., 2006). Regulatory authorities should also include testing schemes for other species and make sure that adequate resources for continuous surveillance are available and enforced.

In the case of adventitious presence, allowances have to be considered in laws, regulations and standards for these materials. In this context, a proposal similar to the one adapted for GMO may be considered by regulatory bodies. For instance, analytical results below 0.1% may be treated as equivalent to zero for enforcement purposes (Food Standards Agency, 2010). Similarly trace levels ≥ 1% may be considered significant to judge the possibility of adulteration or gross negligence. In the case of religious sentiments, consumers may be informed through labeling that the product may contain traces of pork or beef depending on the nature of the meat products processed in the industry thus protecting the religious faiths.

Concluding remarks

It is widely accepted that consumers have the right to know and choose what they want to eat. In addition to material facts and other useful safety

information, information on authenticity related issues would certainly boost consumer confidence on the products. Legitimate allowances for low level presence along with warning on other meat traces may help to alleviate problems associated with meat authenticity. A collective action by continuous monitoring scheme along with improved detection methodologies and stringent regulation on defaulters will certainly minimize or even eliminate authentication problems in future.

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